Name: Date:

Polynomial Factoring solution (version 622)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 + 6x + 29 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(6) \pm \sqrt{(6)^2 - 4(1)(29)}}{2(1)}$$

$$x = \frac{-(6) \pm \sqrt{36 - 116}}{2(1)}$$

$$x = \frac{-6 \pm \sqrt{-80}}{2}$$

$$x = \frac{-6 \pm \sqrt{-16 \cdot 5}}{2}$$

$$x = \frac{-6 \pm 4\sqrt{5}\, i}{2}$$

$$x = -3 \pm 2\sqrt{5}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $-5 + 6i$ and $-8 - 2i$ in standard form $(a + bi)$.**

Solution

$$(-5 + 6i) \cdot (-8 - 2i)$$

$$40 + 10i - 48i - 12i^2$$

$$40 + 10i - 48i + 12$$

$$40 + 12 + 10i - 48i$$

$$52 - 38i$$

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3. **Write function $f(x) = x^3 + 2x^2 - 29x - 30$ in factored form. I'll give you a hint: one factor is $(x + 6)$.**

Solution

	1	2	-29	-30
-6		-6	24	30
	1	-4	-5	0

$$f(x) = (x+6)(x^2 - 4x - 5)$$

$$f(x) = (x+6)(x-5)(x+1)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = (x+8) \cdot (x+5) \cdot (x+2)^2$$

Sketch a graph of polynomial $y = p(x)$.